



Louisiana DEQ: Nutrient Update

Sara Daigle and Kris Pintado Louisiana Department of Environmental Quality Regional Technical Assistance Group Meeting April 3rd, 2012

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Project Summaries – Inland Rivers and Streams, Freshwater Wetlands, Large Rivers (Red River)

Project I

• "Approaches for Developing Attainable Nutrient Criteria for Louisiana Waterbodies: Rivers and Streams" LSU (Lane et al) Statistical approaches based on EPA guidance; few significant relationships.

Project 2

• "Relationship Between Nutrients, DO Conditions, Habitat, and Fish Assemblage Composition in Louisiana Streams" LSU (Kelso & Rutherford) Relationships inconclusive but provided new data in ecoregion reference streams.

Project 3

• "Effects-based Tools for Nutrient Criteria Development" EPA 6/USGS (Kiesling). Largely inconclusive.

Project 4

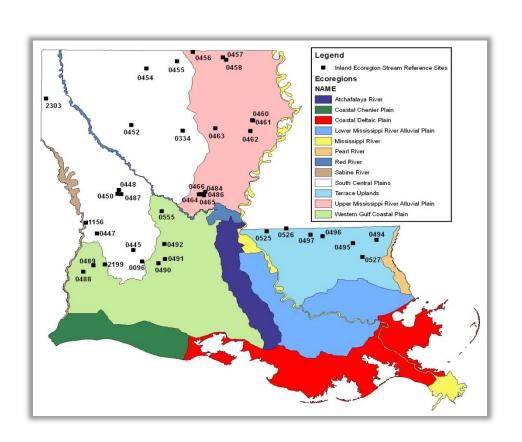
 Louisiana Freshwater Wetlands Draft Data Report – Classification, Literature Review, and Development of Nutrient Criteria LSU (Hunter et al) Builds on wetland assimilation studies. Data gaps in most wetland types; good start at a classification scheme.

Project 5

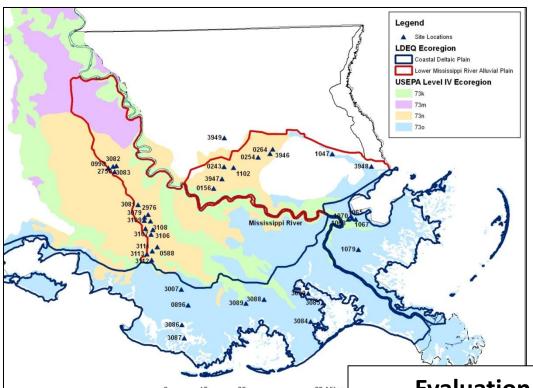
Red River Nutrient Criteria Development Project, Phases I-III University of Arkansas/USDA/EPA 6
 (Haggard and Loving) AR, LA, OK, NM and TX collaboration on nutrient criteria for the Red River
 Basin – state driven inventory, database, delineation; includes cause and effects analysis and technical
 outreach with states.

Nutrient Criteria Development for Inland Rivers and Streams

LDEQ Ecoregion Study







Evaluation of Aquatic Life Uses and Dissolved Oxygen and Nutrient Criteria in Louisiana's Ecoregion Streams

QAPP 1026

Sampling in Water Bodies in the Coastal Deltaic Plains (CDP) and Lower Mississippi River Plains (LMRAP) Ecoregions

Schedules for tasks in the eastern portion of the CDP and LMRAP Ecoregion Project

Date	Task	
June 2009 – July 2009	Selection of reference sites for the various water body types	
August 2009 – December 2009	• Evaluate existing data and identify gaps in '' qen, nutrient, minerals, and biological (fish)	
January 2010 – December 2011	• Collect 72-hour continuous requality, nutrients, minerals, have cover, and biological (fish) requality, and design schedule for this project, as required the eastern or wester and Table 6) and Table 6)	
January 2° Apr"	a evaluatio a analysis Prepare Use Attaina	
May 2	Submit UAA report	
June 2012	Receive UAA report	
July 2012	Submit documentat Quality Standards u	

Reference Stream **Nutrient Reference Ecoregion Reference Data Quality Data Inventory Data Analysis Data Set for Streams** Control (Agency, Project Name & Rivers and Streams (Site Number & Stream Name) Project Number) Summary Statistics South Central Plains (SCP) Louisiana Department Evaluate character and Parameters 0096 Calcasieu River Sample size (n) of Environmental numeric formatting for Total Phosphorus (TP) 0334 Beaucoup Creek Min, Median, Max Quality (LDEQ) each variable 0445 Sixmile Creek Nitrate-Nitrite Mean and Std Dev Ambient Monitoring 0447 Anacoco Bayou (NO3NO2) Percentiles (90th and 95th) (WQ1958001) 0448 Kisatchie Bayou Total Kjeldahl Nitrogen Ecoregion (WQ1991006) Simple 0450 Little Kisatchie Bayou Format parameter names (TKN) 0451 Pocosin Creek* Turbidity (TURB) 0452 Saline Bayou Evaluate differences among Historical data from 0454 Middle Fork Bayou D'Arbonne Total Suspended Solids streams\ecoregions for 1990's 0455 Meridian Creek Format date and time (TSS) nutrient constituents 0487 Little Bayou Pierre New data collection Secchi Disk (SECCHI) 1156 Pearl Creek (Quality Assurance Dissolved Oxygen (DO) 2303 Cross Bayout Project Plan #1023) Check for duplicate data Color (COLOR) Evaluate seasonal Reference Stream differences among Chlorophyll a (CHL A) Survey (ES1995001streams\ecoregions for Canopy Cover (CANOPY) 010; ES1996001-004; Terrace Uplands (TU) nutrient constituents ES1997001) 0494 Boque Lusa Creek Merge all data sets 0495 Tchefuncte River DO Slope (ES2002003) 0496 Crittenden Creek Bear Head Creek TMDL Simple and Multiple Linear 0497 Darling Creek (ES2000015) Evaluate Qualified Data Assign categories to Regression relationships 0525 West Fork Thompsons Creek data by: among\between nutrient Big Saline Bayou TMDL Laboratory qualifiers 0526 Little Comite Creek constituents (similar to (ES2006001) evaluated 0527 Bogue Falaya River Seasons Lane and Day 2008) Two · CHL A, TSS, TDS, TURB Evaluate outliers and Summer is May r², Significance of p = 0.05 and 0.01 U.S. Forest Service data sources through October Upper Mississippi River Alluvial Kisatchie National Forest Winter is November Plains (UMRAP) Study (WQ1996002) not yet through April 0456 Frank La Pere Creek Cause and Effect Evaluate non detects 0457 Chemin-a-haut Creek Drainage Size Relationships 0458 Bayou Bartholomew Method Detection Limit Classifications TSS, TDS, TURB, and 0460 Leading Bayou Louisiana State Small SECCHI vs. CHL A, 0461 Buckshot Bayou Complex Practical Quantitation Statistical analyses University (LSU) Medium NO2NO3, TKN, and COLOR 0462 Big Roaring Bayou Limit (PQL) 0463 Cross Bayou Kelso et al. 2008 Large 0464 Big Saline Bayou (Relationships between 0465 Indian Bayou nutrients, dissolved oxygen Investigate relationship of 0466 Duck Slough DO with nutrient conditions, habitat, and fish 0484 Muddy Bayou assemblage composition in constituents 0486 John's Bayou Louisiana streams) Lane and Day 2008 Physical Stream (Approaches for Western Gulf Coastal Plains Developing Attainable Characteristics (WGCP) Nutrient Criteria for Relationships Louisiana Water Bodies: 0488 Bear Head Creek Size classification 0489 Beckwith Creek Rivers and Streams) differences (according to 0490 Castor Creek* drainage area) 0491 Bayou Nezpique

*Historical data only (Pocosin, Castor, Cypress Creeks); +Data not included in analysis pending determination of site status (Cross Bayou).

0492 Cypress Creek* 0555 Loving Creek 2199 Hickory Creek



LDEQ's Nutrient Gradient Project

Objectives:

To evaluate relationships between nutrient stressors and biological responses

Guidance:



Office of Water

Mail code 4304T

EPA-820-S-10-001

November 2010

Using Stressor-response Relationships to Derive Numeric Nutrient Criteria

Funding:

- ► FY12 Performance Partnership Grant
- FYII Section 106 base funding
- FY10 and FY11 Section 106 Supplemental Monitoring Funds

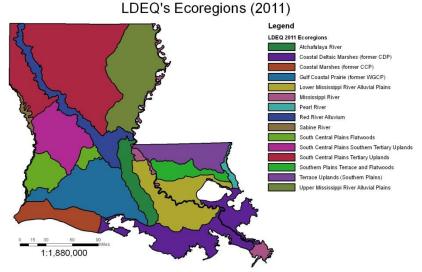




Nutrient Gradient Project Design

- Select 60 stations on inland rivers and streams
 - Classified by ecological region

- Site selection process
 - Sufficient aquatic habitat
 - No nearby urban influence
 - Representative of the ecoregion
 - Accessible
 - Representative of a gradient of nutrient condition
 - Low, medium, and high levels of nutrients





Parameters

Parameter Category	Parameters to be Measured
Water Quality	Nitrate-Nitrite Nitrogen (NO3-NO2) Total Kjeldahl Nitrogen (TKN) Total Nitrogen (Calculated) Total Phosphorus (TP) In situ dissolved oxygen Temperature pH Conductivity Salinity
	Total Suspended Solids (TSS) Secchi depth Turbidity
Habitat Assessment	Watershed features Instream features Sediment/substrate features Water quality features
Canopy Cover	Densiometer readings
	Algae (benthic and sestonic): Chlorophyll a concentration
Biological Response Variables	Fish and Macroinvertebrate Communities: Identification to lowest practical taxon Species counts Individual total lengths (fish only)



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Progress/Status

First quality assurance project plan (QAPP) approved on December 2011

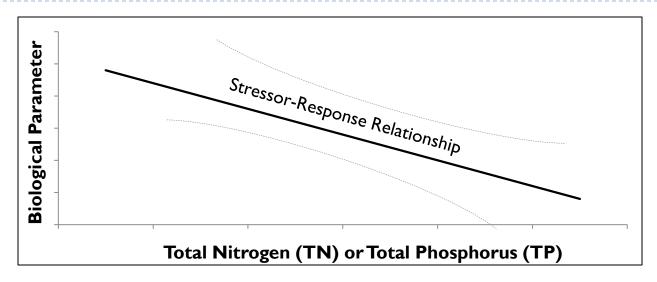
- Fish, habitat, and sestonic chlorophyll a
- Second QAPP submitted to EPA R6
 - Macroinvertebrates and periphyton
- Field reconnaissance complete
- Water quality sampling in progress
- Biological/habitat training in progress
- Biological sampling will begin in June

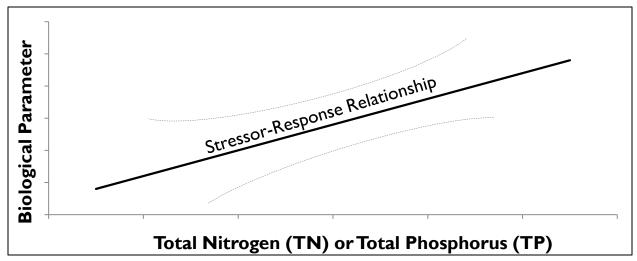






Project Expectations







Value Added...



- Inter-agency collaboration
 - ► EPA R6 and Headquarters on QAPP development
 - USGS and LSU on method development







- Development of new protocols/methodology for LDEQ
 - Use of stressor-response relationships in an ecological framework
 - Use of new methodology for monitoring biological communities
 - Macroinvertebrate and periphyton collection

Nutrients - Path Forward

- Determine state-specific numeric nutrient levels protective of designated uses
 - Focus on statewide applicability (ecoregion framework)
- Nutrient Gradient Study
- Identify regulatory language for flexibility that is consistent with CWA goals
- Develop implementation processes
- Continue to work with NPS communities in voluntary reductions of nutrient loads
- NUTRIENT REDUCTION STRATEGY



Nutrients - Tools Needed

- Cost/benefit analyses for rulemaking
- Funding for improvements/retrogrades
- Regulatory innovations for implementation (e.g., Water Quality Trading)
 - Identify sustainable incentives that support CWA goals
 - Leverage ongoing actions
- Link conservation efforts/incentives with water quality benefits
 - Many tools exist but in most cases data is needed to build states' frameworks





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